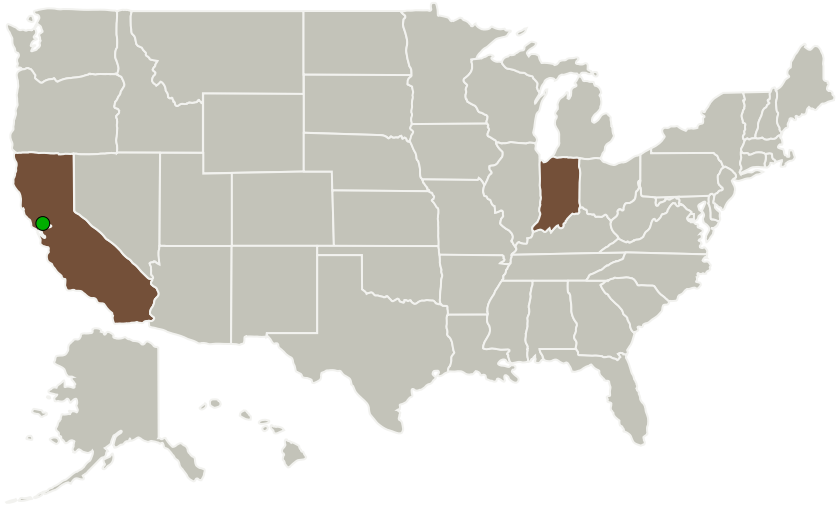
Rodent Centrifuge, Phase I

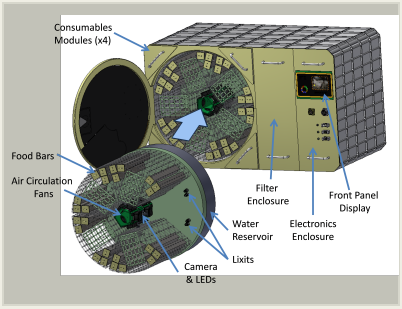
Completed Technology Project (2017 - 2017)

Project Introduction

According to the decadal report titled, Life and Physical Sciences Research for a New Era of Space Exploration, a Report, ??the AHB Panel would be remiss if it did not strongly recommend an animal centrifuge capable of accommodating rats/mice at variable gravity levels.? Furthermore, the panel stated, ?? research on animal models will be constrained without the ability to manipulate the gravity variable as a factor modulating the fundamental processes underlying organ system homeostasis.? In response, Techshot has proposed to develop a Rodent Centrifuge Facility (RCF-QL) that utilizes four locker locations (Quad Locker) in the EXPRESS Rack for life science research. The counter-balanced centrifuge is designed to provide a facility to allow rats and mice to live and be observed in simulated gravity between 0-1 g for up to 90 days. The RCF-QL provides up to five cages. Each cage can accommodate at least six 30 gram mice, three 200 gram rats, or two 400 gram rats per cage. Each individual cage has ablib food and water, controllable lighting, and video monitoring. The habitat is temperature controlled with constant airflow throughout the cages. Air flow entraps waste in a filter that also treats the waste for bacteria and odor. Additional air filters will remove odors and ammonium from the animal enclosure. The subsystems design will minimize crew time. Each subsystem requiring change-out during the 90 day experiment will be designed to be simple and intuitive in operations. The RCF-QL will be the only facility capable of providing group housing for rats and mice, with a medium diameter centrifuge (20 in., 0.508 m) and a large rotating cage volume (1000 in3, 16,400 cm3 for the cage). All hardware cage features are designed to meet NIH animal care and use standards.

Primary U.S. Work Locations and Key Partners





Rodent Centrifuge, Phase I Briefing Chart Image

Table of Contents

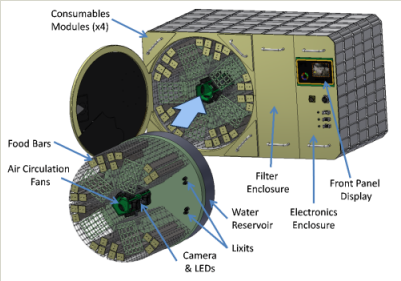
Rodent Centrifuge, Phase I

Completed Technology Project (2017 - 2017)

Organizations Performing Work	Role	Type	Location
Techshot, Inc.	Lead Organization	Industry	Greenville, Indiana
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	Indiana

Images



Briefing Chart Image
Rodent Centrifuge, Phase I Briefing Chart Image *(https://techport.nasa.gov/image/133094)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Techshot, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

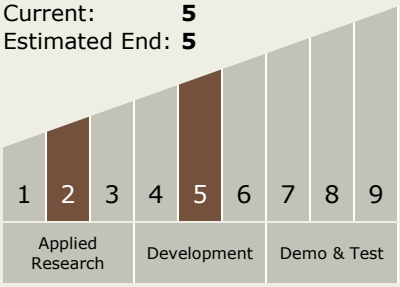
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
John C Vellinger

Technology Maturity (TRL)

Start: **2**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.3 Human Health and Performance
    - TX06.3.6 Long Duration Health

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System